

THE PRESERVE

UNESCO DESIGNATION

The great size, diversity, naturalness, and complexity of the Noatak Basin was recognized in 1976 for its international importance as a "biosphere reserve" under the Man and the Biosphere program. This program, established by the 16th General Conference of the United Nations Educational, Scientific, and Cultural Organization (UNESCO), seeks to identify areas worldwide to act as natural baselines against which changes in the dynamics of other ecosystems can be detected. Additionally, these areas provide a means for maintaining genetic pools of animal and plant species. In 1985 the boundary of the Noatak Biosphere Reserve was changed to include the headwaters of the Noatak River within Gates of the Arctic National Park.

NATURAL RESOURCES

Physiography

The Noatak basin is bounded on the north and the northwest by the DeLong Mountains and is considered part of the Arctic Mountains Physiographic Province. The DeLong mountain range contains rugged, narrow, glaciated ridges between 4,000 and 4,900 feet in elevation with a local relief of 1,500 to 3,000 feet. Rivers on the north and west of the mountains drain into the Beaufort and Chukchi seas. The lower, western end of the mountain range trends southward to become the Mulgrave Hills, which divide the central Noatak basin from the Chukchi Sea coast on the west. From the Mulgrave Hills the Noatak River flows south into Kotzebue Sound.

To the south of the Noatak drainage are the Baird Mountains, ranging from 2,500 to 3,000 feet in elevation. The Baird Mountains slope gently northward toward the Noatak basin and divide it from the Kobuk drainage to the south.

The lowland area formed by the Noatak River drainage can be divided into two distinct zones. The Mission Lowlands, on the downstream end of the Noatak River, encompass a broad, flat, tundra area, which has numerous permafrost (permanently frozen ground) features including thaw lakes (pools of water that collect in natural depressions and cause the thaw of some underlying permafrost), pingos (ice-cored conical hills), and a forested floodplain. Permafrost is discontinuous along the actual drainage. The Aniuk Lowlands are an irregular rolling plain to the north of the drainage that slope gently toward the Baird Mountains on the south and are underlain by continuous permafrost.

The Noatak River is 435 miles long and flows westward from within the central western Brooks Range to Kotzebue Sound and the Chukchi Sea on Alaska's northwest coast. The river crosses more than a third of arctic Alaska, draining an interior plateau valley of 12,600 square miles in the Arctic Mountains Physiographic Province.

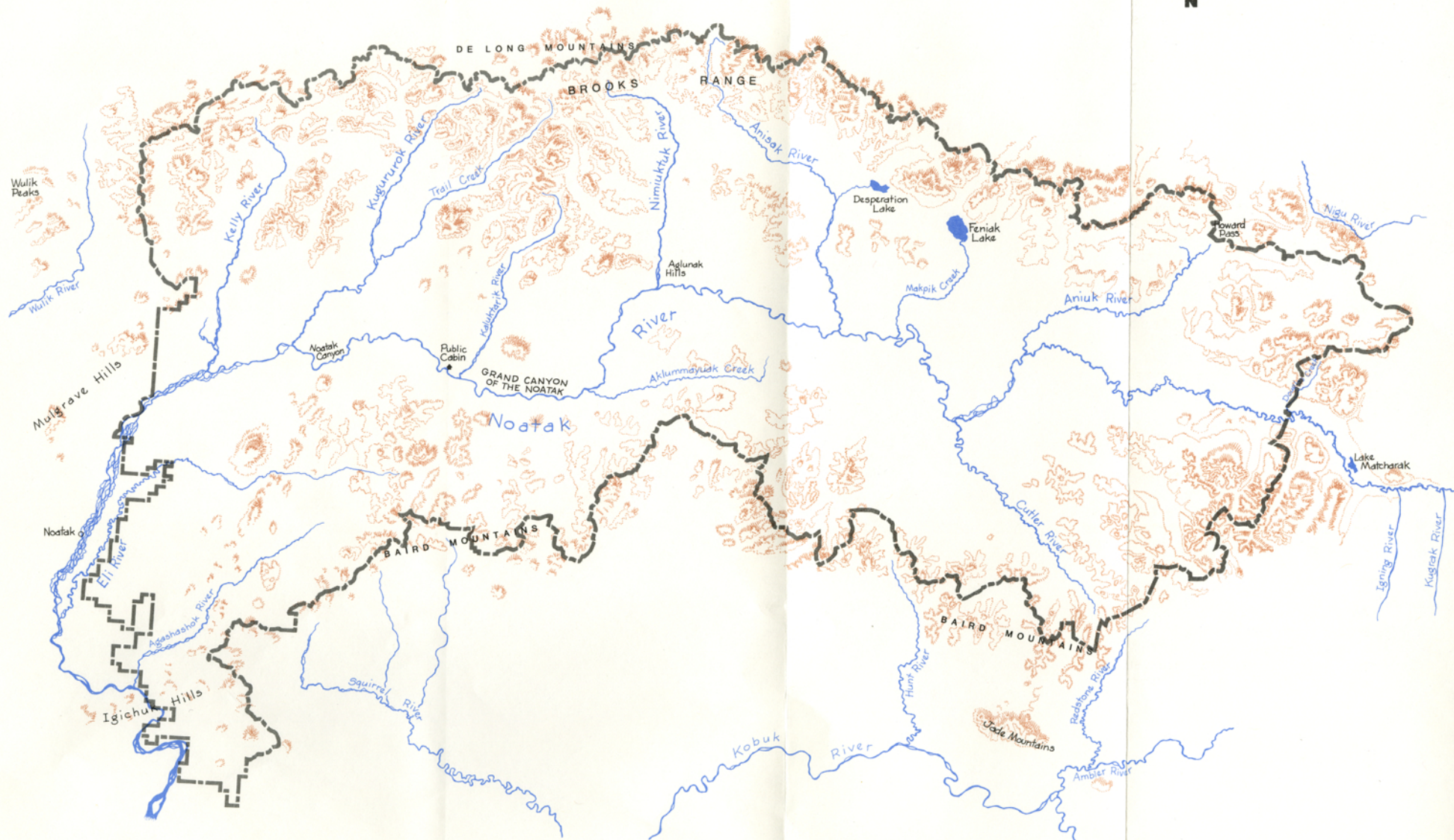
THE PRESERVE

Noatak National Preserve

United States Department of the Interior
National Park Service

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From a point just west of Lake Matcharak, at Douglas Creek, the Noatak River enters the preserve. A major moraine belt begins along the valley below Douglas Creek. There the river channel becomes filled with boulders, forming the largest (class II) and longest rapids (about eight miles) along the river. Below the Aniuk River confluence, the Noatak valley floor widens into a broad plateau, flanked by bedrock ridges 20 to 40 miles apart. The valley floor is, in fact, a vast till plain into which the river and its modern floodplain are incised to a depth of 200 feet or more. Nearly continuous lines of 100-foot-high bluffs border the floodplain or intersect the river's course in places where the river flows against them.

In the middle of Noatak National Preserve, the landscape is characterized by immense sweeps of tundra country, which is dotted with ponds and marshes. This landscape extends beyond the lower morainal ridges to the distant mountain edges of the basin. The Noatak's broad central basin extends some 50 miles west to the Aglungak Hills near the Nimiuktuk River confluence. There the valley narrows again, sometimes to less than three miles wide. The surrounding mountains reach heights of 2,000 to 3,000 feet. This 65-mile-long valley is known as the "Grand Canyon of the Noatak," and it cuts a broad S-curve in the river's course. At the lower end of the valley the river cuts for 7 miles through the spectacular Noatak Canyon, a gorge with vertical walls of metamorphic rock some 200 to 300 feet high.

The Noatak River bends to the south just downstream of the Kelly River, leaves the preserve, and enters a lowland forested plain. The river enters a broad, coastal delta zone before emptying into Kotzebue Sound just north of Kotzebue.

Geology

The basic geological framework of the northwest region was set by the late Paleozoic era and included the Brooks Range geosyncline (a broad sedimentary trough), the Arctic Foothills, and the Arctic Coastal Plain. During the Triassic period (Mesozoic era), the site of the present Brooks Range was stabilized, and limestone and chert were formed. The process of mountain-building began during the mid-Jurassic period. By the Cretaceous period the Brooks Range dominated the landscape, and volcanic activity from the Jurassic period continued in an area south of the range.

The sedimentary rocks of the Brooks Range and the DeLong Mountains were intensely folded and faulted during the late Cretaceous period. It was during this time that the existing east-west fault trends within the area were established. A resurgent strong uplift during the early Tertiary period (Cenozoic era) was responsible for the present configuration of the Brooks Range. Volcanic activity produced intrusions and debris throughout the region during the Tertiary and Quaternary periods.

Bedrock geology of the DeLong Mountains includes faulted and folded sheets of sedimentary clastic rocks with intrusions of igneous rock. Shale, chert, and limestone of Paleozoic and Mesozoic eras are dominant. Graywacke and mafic rock of the Jurassic and Cretaceous periods are also found.

The lowland area of the Noatak drainage is underlain primarily by siltstone, sandstone, and limestone of the mid-to-late Paleozoic era. Also in evidence are graywacke, chert, and igneous rock of Mesozoic origin.

The Baird Mountains south of the lowland are composed of strongly folded sedimentary rocks with granitic intrusions. Known bedrock consists primarily of Paleozoic or older, highly metamorphosed rocks.

Unconsolidated deposits of gravel, clay, silt, and sand are concentrated in lowland areas of the Noatak drainage. These deposits are a potential source of groundwater for the people and developments that also use the lowland areas.

Permafrost plays an important role in the geologic processes and topographic development of the preserve. The Noatak drainage and adjacent lowland areas are underlain by discontinuous permafrost, and areas in the Baird and DeLong mountains are underlain by continuous permafrost. Permafrost can reach depths of 2,000 feet, but is generally between 15 and 260 feet in the Noatak area.

Continental ice sheets did not cover all of northwest Alaska during the Pleistocene period, although glaciers did cover most upland areas. The last retreat of the glaciers, about 4,500 years ago, established the present sea level and the extensively glacially carved landscape that is in evidence today. This landscape is characterized by deep, U-shaped valleys, rocky peaks, and braided streams. A portion of the Noatak valley lowland was glaciated during Wisconsin time and today is typified by such glacial features as kame, kettles, moraines, and alluvial till.

The northwest Alaska region generally holds promise for mineral extraction. An area of potential for copper, gold, lead, and zinc is southeast of the the preserve in the Baird Mountains. Placer gold claims have been staked in Gates of the Arctic National Park near the headwaters of the Noatak River at Lucky and Midas creeks. The DeLong Mountains are considered to have significant potential for deposits of such metals as chromium, nickel, copper, lead, and zinc. This sedimentary terrain in the DeLong Mountains crosses the northern portion of the preserve and contains several mineral deposits of varying size in and out of the preserve. Three known mineral deposits near the northern boundary of the preserve (Lik and Red Dog about 20 air miles west and Drenchwater about 10 miles north) are considered to be large mineral deposits of lead, zinc, and silver. Anomalous concentrations of zinc have been reported in the upper Kugururok and Anisak river drainages, and other small or unevaluated mineral deposits of chromium, lead, silver, zinc, and copper have been reported within the preserve (Arctic Environmental Information and Data Center 1982). There are, however, no valid mining claims within Noatak National Preserve.

Paleontological resources are fossil remains or traces of prehistoric animals or plants that have been preserved in the earth's crust. In northwest Alaska microfossils (for example pollen and spores) and fossils provide valuable scientific information. The association of the dated fossils with nearby materials helps scientists piece together geologic history and reconstruct

PALEONTOLOGY

(FOSSIL COLLECTION SITES)

- SITE 1. CONODONTS / RADIOLARIANS
- SITE 2. CONODONTS / RADIOLARIANS
- SITE 3. CONODONTS / RADIOLARIANS
- SITE 4. BRACHIOPODS
- SITE 5. CONODONTS
- SITE 6. STROMATOPOROIDS / CORALS
- SITE 7. CONODONTS
- SITE 8. PLANTS (MESOZOIC)
- SITE 9. CONODONTS
- SITE 10. ECHINODERMS / BRACHIOPODS / SPONGE
- SITE 11. CORALS / BRACHIOPODS / CONODONTS
- SITE 12. RADIOLARIANS / PELECYPODS / CONODONTS
- SITE 13. ECHINODERMS / CORALS / BRACHIOPODS

SOURCE: (FOR SITES 1-13) MF 1441, GEOLOGY OF THE SWITZANNEYAK MOUNTAINS AND MT. OPHOLITE, HOWARD PASS QUAD, BY STEVEN W. NELSON AND WILLIS H. NELSON, 1982.

- SITE 14. CORALS (MISSISSIPPIAN)
- SITE 15. CORALS (MISSISSIPPIAN)
- SITE 16. CORALS (MISSISSIPPIAN)
- SITE 17. CORALS (MISSISSIPPIAN)
- SITE 18. CORALS, STROMATOPOROIDS, GASTROPODS
- SITE 19. CORALS, STROMATOPOROIDS, GASTROPODS
- SITE 20. CORALS, STROMATOPOROIDS, GASTROPODS

SOURCE: (FOR SITES 14-20) 1554, REGIONAL GEOLOGIC MAP OF THE SHUNGNAK AND SOUTHERN PART OF THE AMBLER RIVER, BY W.W. PATTON, JR., T.P. MILLER AND IRVIN L. TAILLEUR, 1968.



SITE LOCATIONS



OTHER MAPPED SITES

OTHER UNMAPPED PALEONTOLOGICAL RESOURCES OCCUR IN THESE PARKS.

GEOLOGY & PALEONTOLOGY

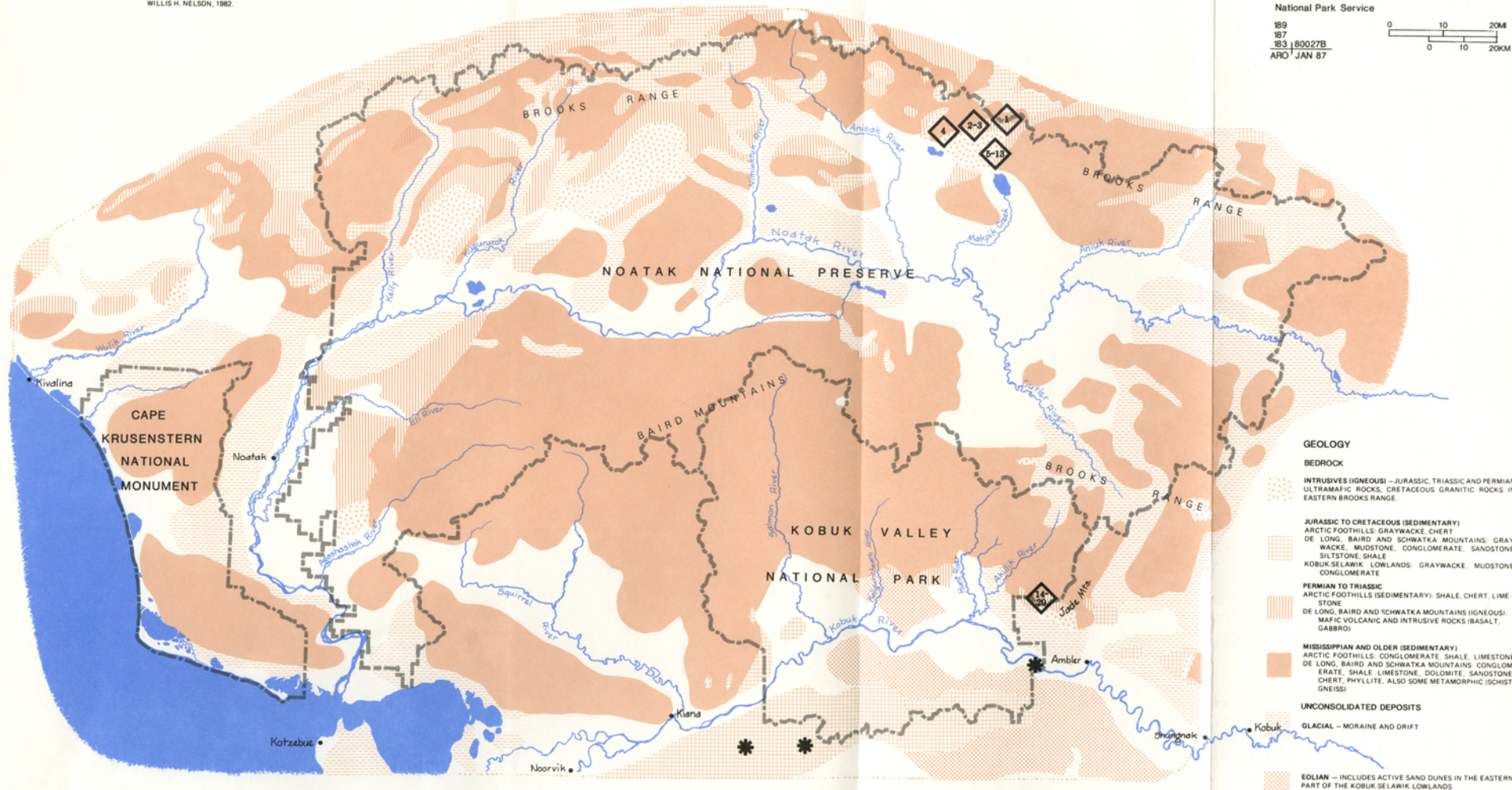
Cape Krusenstern National Monument

Kobuk Valley National Park

Noatak National Preserve

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GEOLOGY

BEDROCK

INTRUSIVES (IGNEOUS) - JURASSIC, TRIASSIC AND PERMIAN ULTRAMAFIC ROCKS, CRETACEOUS GRANITIC ROCKS IN EASTERN BROOKS RANGE.

JURASSIC TO CRETACEOUS (SEDIMENTARY)
ARCTIC FOOTHILLS: GRAYWACKE, CHERT
DE LONG, BAIRD AND SCHWATKA MOUNTAINS: GRAY WACKE, MUDDSTONE, CONGLOMERATE, SANDSTONE, SILTSTONE, SHALE
KOBUK SELAWIK LOWLANDS: GRAYWACKE, MUDDSTONE, CONGLOMERATE

PERMIAN TO TRIASSIC
ARCTIC FOOTHILLS (SEDIMENTARY): SHALE, CHERT, LIME STONE
DE LONG, BAIRD AND SCHWATKA MOUNTAINS (IGNEOUS): MAFIC VOLCANIC AND INTRUSIVE ROCKS (BASALT, GABBRO)

MISSISSIPPIAN AND OLDER (SEDIMENTARY)
ARCTIC FOOTHILLS: CONGLOMERATE, SHALE, LIMESTONE
DE LONG, BAIRD AND SCHWATKA MOUNTAINS: CONGLOMERATE, SHALE, LIMESTONE, DOLOMITE, SANDSTONE, CHERT, PHYLLITE, ALSO SOME METAMORPHIC (SCHIST, GNEISS)

UNCONSOLIDATED DEPOSITS

GLACIAL - MORaine AND DRIFT

EOLIAN - INCLUDES ACTIVE SAND DUNES IN THE EASTERN PART OF THE KOBUK SELAWIK LOWLANDS

FLUVIAL/COASTAL/UNDIFFERENTIATED DEPOSITS:
ALLUVIAL (FLUVIAL) - FLOODPLAIN, TERRACE AND ALLUVIAL FAN DEPOSITS ASSOCIATED WITH STREAMS AND RIVERS
COASTAL - OLDER INTERLAYED ALLUVIAL AND MARINE SEDIMENTS AND MODERN BEACHES, DELTAS, BARS AND SPITS

SOURCE: ALASKA REGIONAL PROFILES - NORTHWEST REGION, BY LIDIA L. SELKREGG FOR STATE OF ALASKA, UNIVERSITY OF ALASKA, ARCTIC ENVIRONMENTAL INFORMATION AND DATA CENTER, ANCHORAGE, AK, NO DATE P. 63

former climates and ecosystems. If the fossil is taken out of its context, much of this potential information is lost.

Several microfossils have been identified in the preserve during surficial geological studies (Geological Survey 1982). They are named and located on the Geology and Paleontology map.

Perhaps the most interesting northwest Alaskan fossils to the general public are the bones of Pleistocene mammals, such as mammoths. Bones and tusks have been found along the Noatak River and are on display in museums around the state. Fossils exposed by stream erosion may be washed away by the river.

Soils

The three major soil types within the preserve include the upland or mountain slope soils of the lithosol type, tundra soils, and soils associated with the Noatak drainage and lowlands.

Lithosol soils on the higher slopes of the DeLong and Baird mountains are limited and are mostly imperfectly weathered rock fragments and barren rock. The soil is without zonation and consists of a thin layer of highly gravelly and stony loam. Where this soil accumulates in protected pockets on mountain slopes, it supports mosses, lichens, and some dwarf shrubs.

Below the upland soils on more gently rolling terrain, the tundra soils predominate. These are dark, humus-rich, nonacid soils. Texture in the tundra soils varies from highly gravelly to sandy.

The floodplains of the Noatak and its tributaries are characterized by silty and sandy sediments and gravel. These soils occur in association with the greatest proportions of organic material along the lower reaches of the Noatak. A fibrous peat extends to the permafrost layer in many areas. Vegetation includes mosses and sedges, with black spruce becoming more abundant in loamy areas.

Soil conditions within the preserve limit the potential for forestry, crop growth, off-road vehicle use, and other activities that might damage the soil surface. Family gardening projects at Ambler and in other northwest villages have met with success, showing that some limitations in soils can be overcome through careful cultivation and fertilization. Building foundation development is also limited, and any future development proposal in the preserve should be preceded by an on-site analysis that considers soil properties such as compaction, permeability, grain size, and extent of permafrost.

Soil erosion along the Noatak riverbanks is considered severe. This occurs during spring breakup when high volumes and velocities of water scour the riverbanks and carry sediment downstream. In places where waters contact ground ice in adjacent riverbanks, thermal erosion can occur. As the ice melts, banks are undercut and sediments are swept downstream. Additional erosion can occur during high precipitation and storm periods in summer. In the past Noatak village has experienced 5 to 6 feet of bank erosion each year, and village developments have been threatened.

Hydrology

The Noatak and Kobuk rivers are the principal surface water resources within northwest Alaska. As such, the fish, wildlife and human residents of the region depend upon the quality and quantity of these vital resources. The Noatak is the eleventh largest river in Alaska in terms of the area it drains. Before flowing into Hotham Inlet of Kotzebue Sound, the river drains 12,600 square miles and has an average annual flow of 10,900 cubic feet per second (cfs) or an estimated flow of 6.5 billion gallons per day (Arctic Environmental Information and Data Center 1975, p.98). The main artery of the Noatak is 435 miles long. Eleven rivers, from 35 to 100 miles long, are tributary to the Noatak, as are 37 unnamed streams.

Average annual runoff for the area encompassing the Noatak drainage is about 1 cfs or less per square mile (Darbyshire and Associates 1983). Low precipitation, the presence of permafrost, and numerous low mountains are responsible for the limited yet variable runoff conditions. Lowland areas in the region experience annual peak runoff of 25 cfs or more per square mile.

Water storage affecting streamflow in the Noatak and other northwest Alaska rivers is primarily dependent upon snowpack. During low-flow periods, streamflow is sustained in large part by groundwater that has concentrated in streambed alluvium. Long periods of summer rain can cause flooding on the Noatak and its tributaries. Winter flooding is caused by broad icing, which expands beyond the open channel at normal flood stages. Flooding most commonly occurs between May and mid-June during the spring breakup when water overflows ice that is still frozen to the streambed. The downstream movement of ice sometimes causes ice jams and additional flooding. In some cases, flooding can extend up to several miles from the center of the stream channel. The hazards of ice jamming and stream overflow at the village of Noatak are considered low, but some flooding occurred there during 1971 and 1972. Fall flooding can also be severe, especially when freezing has begun and a major storm front moves through the basin. A September 1982 storm raised the river level over 5 feet and resulted in two deaths.

Many lakes are within the Noatak watershed. Feniak Lake is the largest within the preserve boundary. Countless thaw ponds and potholes occur throughout the area, most as a result of permafrost that impedes the downward percolation of water that collects in depressions. Other ponds and lakes were formed as detached oxbows of the meandering river or developed as part of the extensive flat delta at the mouth of the Noatak River.

Lake waters are generally lower in dissolved solids than river waters. Tundra lakes, however, are often characterized by unpleasant odor and brownish color or by the presence of iron. Lowland surface waters are generally high in organic material.

Although water quality varies with location, season, and source, it is ordinarily clear and cool and reflects an undiminished natural high quality that is unaffected by man's activity. Water sampling indicates the water "possesses no chemical or biological characteristics which would tend to limit utilization of this water resource. . ." (Geologic Survey 1981, p. 36).

Current community water sources in the region include wells, springs, and surface waters from lakes and streams. Kotzebue stores up to 1.5 million gallons of water pumped from a nearby lake. Noatak village utilizes a shallow well on the Noatak River, with 50,000-gallon storage, chlorination and fluoridation.

Wildlife and Fish

Wildlife is a primary resource of the Noatak National Preserve. Thirty-seven mammal species representing 14 families are known or believed to inhabit the Noatak valley. Included are caribou, moose, Dall sheep, grizzly bear, wolf, fox, lynx, marten, beaver, and muskrat.

Caribou. Caribou found within the preserve are part of the western arctic caribou herd, which ranges over the entire region. The herd declined from about 242,000 in 1970 to about 75,000 in 1976 (ADF&G 1984). Since that time the herd has continued to increase in size and is now projected to be approximately 200,000 animals (J. Davis, pers. comm., 1984). Summer range is north of the Brooks Range and west to the Chukchi Sea. As fall approaches, animals congregate and begin a migration to the east toward Anaktuvuk Pass and the Killik River in Gates of the Arctic National Park, south toward the Aniuk-Nimiuktuk rivers, and west along the Chukchi coast (NPS 1974). Crossing the Noatak River toward the south usually begins in mid-August and the Kobuk River in late August. Most caribou are moving through these areas from mid-September to early October. The Hunt River drainage is a primary corridor for the southward migration, and the Squirrel and Redstone drainages are used to a lesser extent. The rut begins in October south of the Noatak and occurs, to a great degree, within the Squirrel River drainage.

The caribou continue toward winter ranges to the south and the east of the Noatak drainage. Although wintering areas vary from year to year, the area encompassing the Selawik Hills, the Buckland River and the Selawik River headwaters are primary wintering areas for the western arctic caribou herd. Caribou wintering occurs on shrubland, tundra, and to a lesser extent in spruce-dominated forest. The winter pre-calving period is a critical one, particularly for pregnant females. The reproductive success could, at this point, depend upon the availability of forage.

The spring migration begins in March and continues until early to mid-April. At this time the herd moves back north toward the Arctic Coastal Plain. Most of the crossing of the Kobuk River is near Ambler, with movement northward within the Hunt and Redstone river valleys in the Baird Mountains and then into the Cutler drainage. The movement continues northward, crossing the Noatak drainage and paralleling the Anisak, Kelly, Kugururok and Nimiuktuk rivers. Calving occurs between May 25 and June 25 north of the DeLong Mountains in an area encompassing the upper drainages of the Ketik, Meade and Utukok rivers. Most animals disperse to summer ranges north of the Brooks Range after calving, but in recent years up to 30,000 animals have moved east near the Wulik River in July. Approximately 1,000 animals from the western arctic herd are harvested in the Noatak basin annually, about two-thirds by local hunters (ADF&G, Kotzebue, personal communication, 1984).

Moose. Moose are found within major drainages of northwest Alaska, and about 2,200 animals are in the middle Noatak drainage (ADF&G 1985b). The Kugururok River hosts particularly high numbers of the Noatak's moose population. Moose were very scarce within the region until about 50 years ago. The population has steadily increased in recent years. Annual harvest of moose for the entire northwest region is estimated to be 300 to 400 animals, with 80 percent of the take by local hunters. During the 1981-1982 season, 140 animals were reported taken from the Noatak and Kobuk drainages.

Dall Sheep. Dall sheep are present throughout the Baird and the DeLong mountains and west into the Wulik peaks. Within this region Dall sheep reach the northwestern limit of their distribution. A survey of Dall sheep within the region and encompassing the three northwest NPS areas was conducted by the National Park Service and the ADF&G during 1983 and 1984. On lands under NPS jurisdiction (Noatak National Preserve, Kobuk National Park, and Cape Krusenstern National Monument), 1,556 sheep were counted during this survey. These counts averaged 19 percent higher in 9 of the 10 count units previously surveyed by the ADF&G from 1976 to 1981. The lowest sheep densities within the survey units were substantially lower (.01 to .27 sheep per square mile) when compared to lower densities in other areas within the state (Gates of the Arctic National Park and Preserve = .3 sheep per square mile and Wrangell-St. Elias National Park and Preserve = .6 sheep per square mile). Important habitats are found north of the Noatak River above the confluence with the Igning River and within the upper Kelly, Kugururok, Eli, and Agashashok river drainages.

Bears. Grizzly bears frequent moist tundra and shrub associations and are found along riverbanks throughout northwest Alaska. No comprehensive information regarding the distribution, reproductive biology, or specific food habits exists for the region. They are, however, known predators of caribou and moose. Population estimates range between 700 and 2,400 (Darbyshire and Associates 1983). Within the preserve significant grizzly bear habitat occurs along the Cutler River.

Black bears generally prefer forested areas as opposed to the open tundra zones preferred by grizzly bears. Black bears are known to inhabit the forested Kobuk drainage, but no sightings have been recorded for the tundra areas within the Noatak Preserve.

Musk-ox. The last remaining musk-ox were killed in Alaska in 1865, but musk-ox were reintroduced to the state from Greenland in 1936. Musk-ox have not been known to inhabit the Noatak valley in recent times, although sightings of lone bulls have been made occasionally along the Noatak River over the last three years. The release of 36 musk-ox near Cape Thompson (75 miles northwest of Noatak) in 1970, and a second release of 30 animals in the same area in 1977, may ultimately cause the dispersion of an increasing population of musk-ox into the preserve. In 1973 an area in the Mulgrave Hills 8 to 10 miles west of Noatak village was identified by the ADF&G as summer and winter musk-ox range. Grasses, sedges, wood rushes, and dwarf birch from moist tundra areas are the primary food sources. Approximately 80 animals inhabit the Cape Thompson area (Resource Analysts 1983); approximately 1,000 are estimated statewide.

CARIBOU & MUSK OX

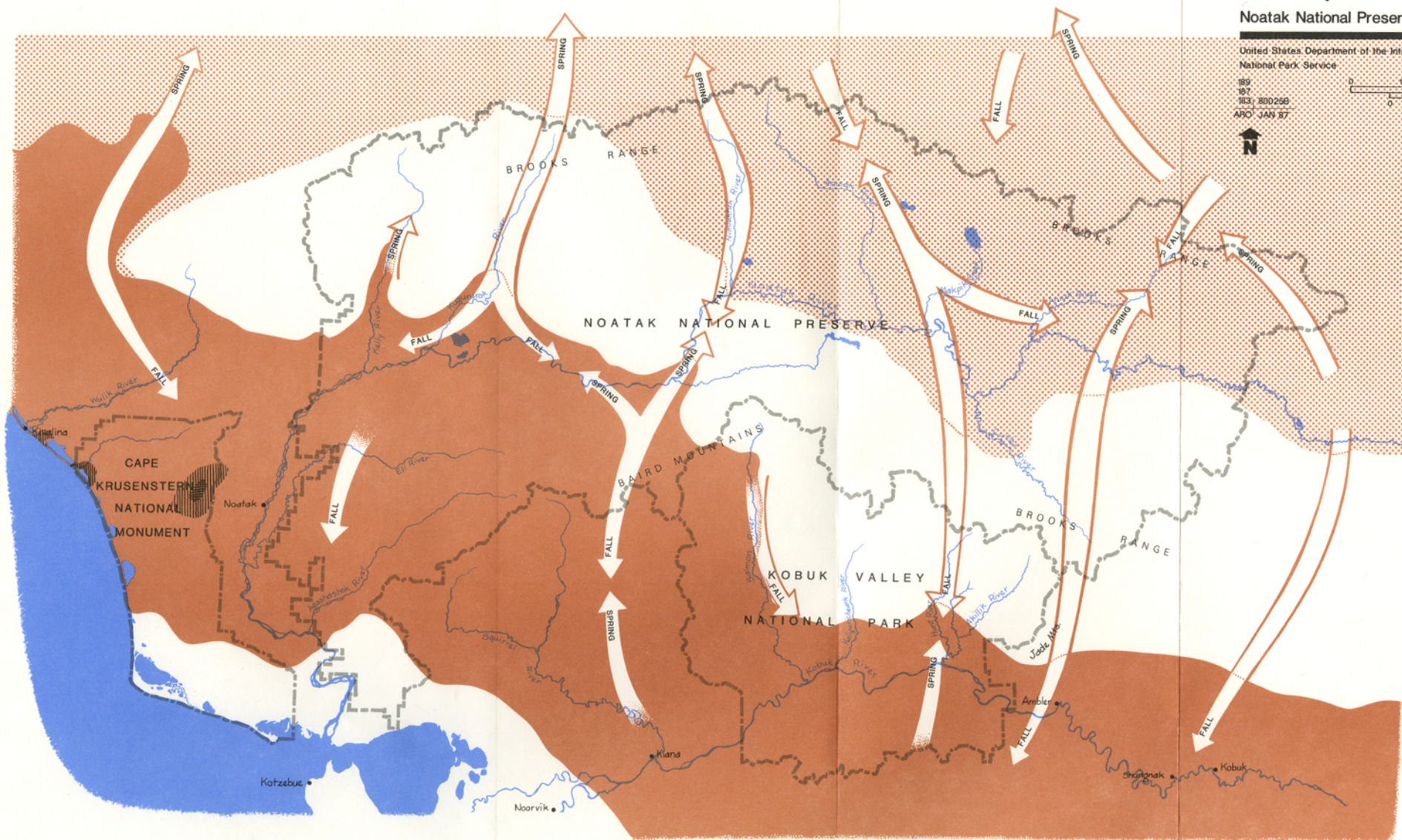
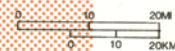
Cape Krusenstern
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CARIBOU

SUMMER

WINTER



MIGRATION ROUTES

MUSK OX

SUMMER

WINTER

SOURCE: ALASKA'S WILDLIFE & HABITAT,
ADF&G, 1973.

DALL SHEEP & MOOSE

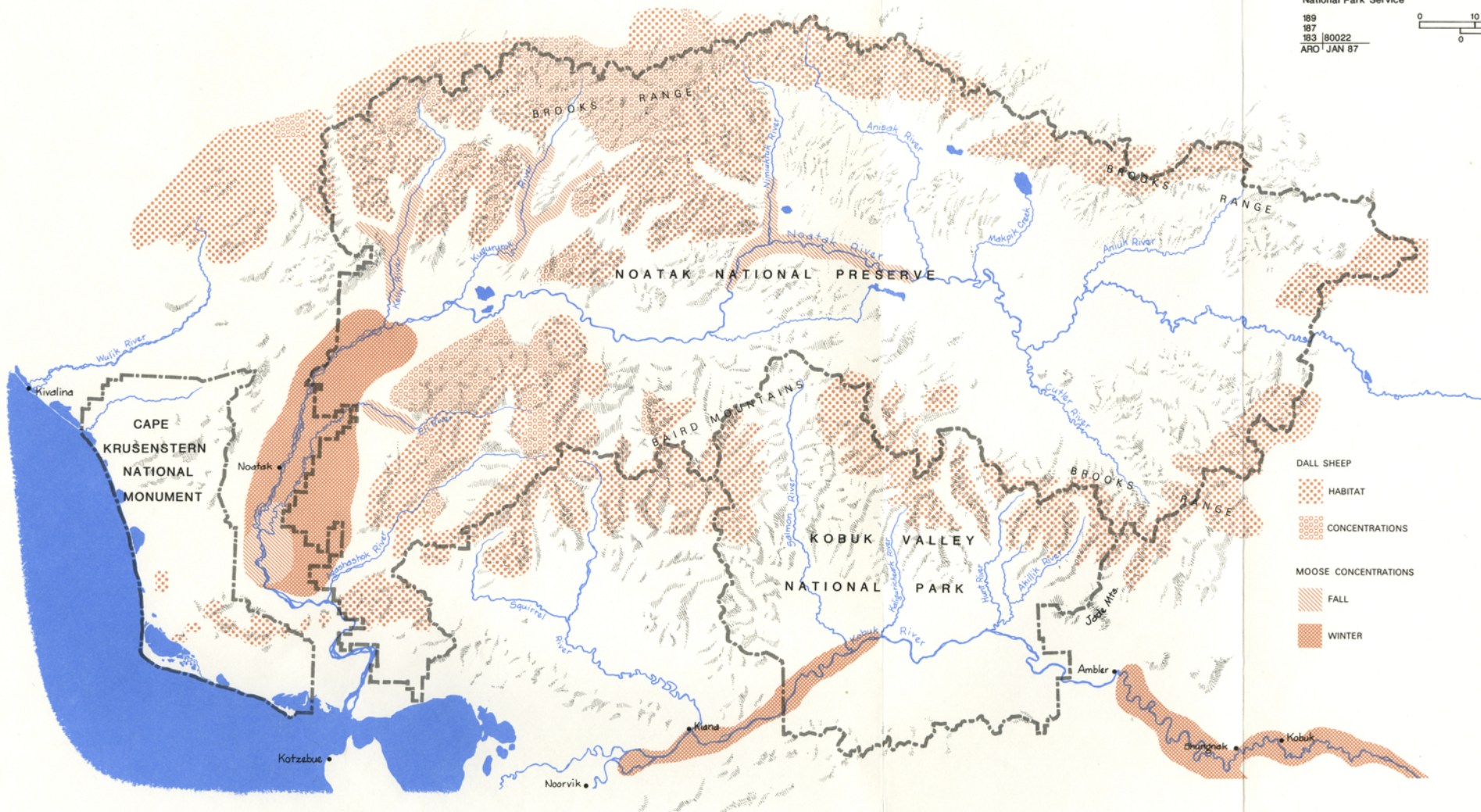
Cape Krusenstern
National Monument

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- DALL SHEEP
- HABITAT
 - CONCENTRATIONS
- MOOSE CONCENTRATIONS
- FALL
 - WINTER

SOURCES: ALASKA'S WILDLIFE & HABITAT,
ADF&G, 1973. ADDITIONAL DALL SHEEP
RANGE DATA: F. SINGER, NPS, 1983.

ARCTIC FOX & BLACK BEAR

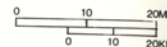
Cape Krusenstern
National Monument

Kobuk Valley National Park

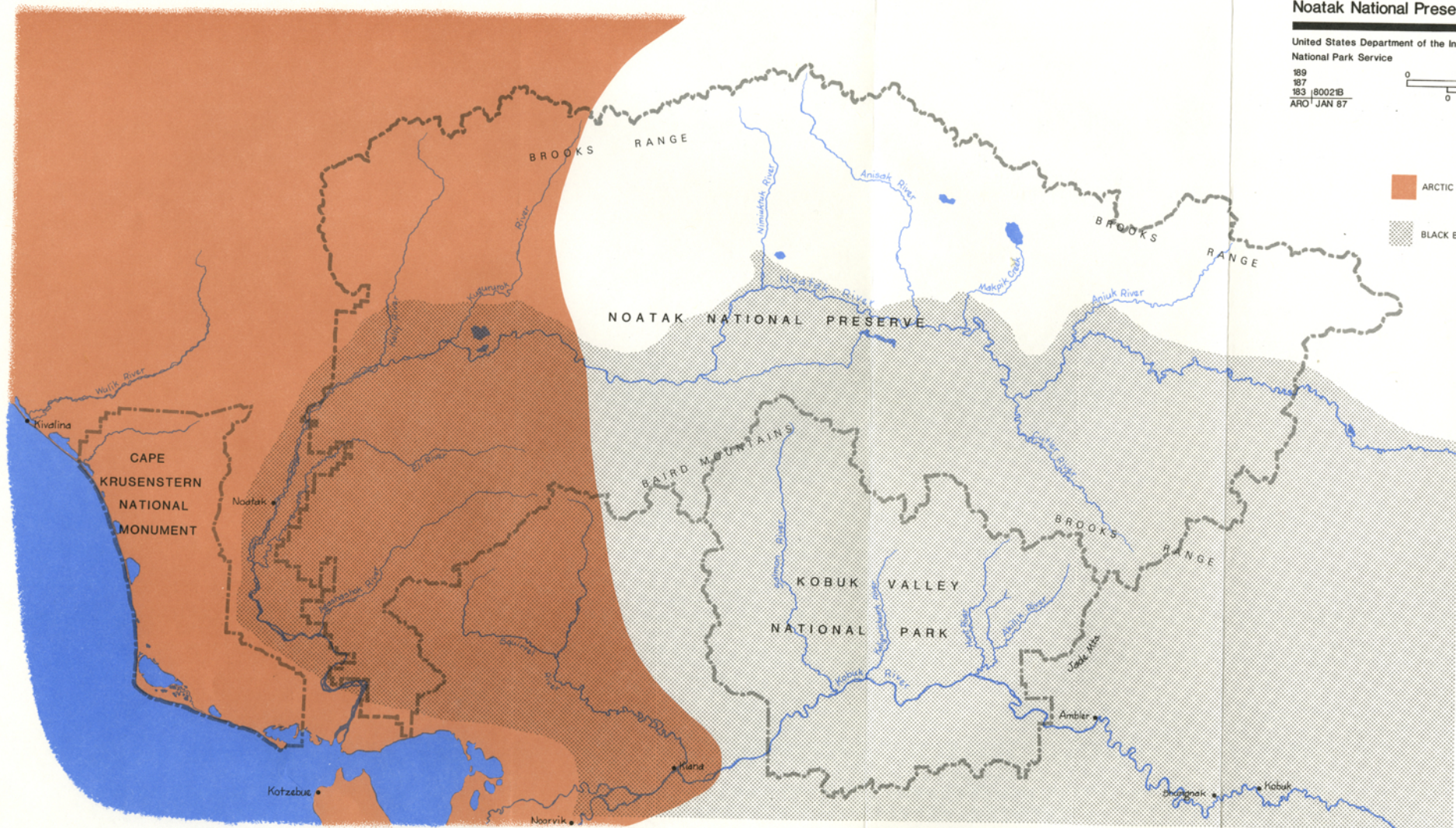
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ARCTIC FOX RANGE
BLACK BEAR RANGE



SOURCE: ALASKA'S WILDLIFE & HABITAT,
ADF&G, 1973.

BROWN BEAR ARE FOUND THROUGHOUT
REGION

Other Mammals. Wolves, wolverine, coyotes, and arctic fox occur within the preserve. Wolves are predators of caribou and moose and travel near migrating caribou in the spring and fall (Resource Analysts 1983). Between 400 and 800 wolves are estimated to inhabit the northwest Alaska region. Wolves are present within all major drainages, as are coyotes and red fox. The arctic fox generally prefers coastal and delta areas mostly within the Arctic Slope area, but is wide ranging in its feeding activities.

Lynx are the only cat species known to inhabit the region, occurring in the forested areas of the lower Noatak.

Six members of the weasel family inhabit the preserve, including the wolverine, ermine, river otter, marten, least weasel, and mink.

Beaver inhabit the Selawik and the upper Kobuk drainages. Their distribution within the Noatak drainage is not well known, although their population size is considered to be increasing regionally. Muskrats are known to exist in small numbers in the Noatak valley, with a prime habitat area on the lower Noatak flats south and east of Noatak village.

A biological survey conducted within the area in 1973 showed that masked shrew, arctic shrew, snowshoe hare, arctic hoary marmot, arctic ground squirrel, lemming, porcupine, and other mammals exist within Noatak Preserve.

Birds. A rich birdlife inhabits the preserve, particularly during the summer months when migrating species visit the region. Approximately 125 bird species representing 31 families have been identified within the preserve, and another 31 species are thought to occur. The northwest Alaska region provides important bird habitat because it is a major breeding area for migratory birds from as far away as Antarctica. This region encompasses a zone of interchange between the flyways of Asia and North America, and it includes important transitional habitat areas between boreal forest, coastal lands, and tundra.

A variety of waterfowl including 25 species inhabit Noatak's wetland area. The Taverner's Canada goose is commonly found breeding in the area, returning to Washington and Oregon in winter. The white-fronted goose also commonly breeds in the preserve, returning to central Canada, Texas, and northern Mexico in the winter. The large, white tundra swan nests on dry shores of tundra lakes within the preserve, particularly in the Noatak drainage west of its confluence with the Kelly River. Some of the approximately 200 pairs of swans migrate to California for the winter, and others make their way to Maryland, Virginia, and other points on the Atlantic coast. Other common waterfowl within Noatak include pintail, American wigeon, greater scaup, oldsquaw, and red-breasted merganser. Less common species include black brant, snow goose, mallard, green-winged teal, shoveler, common goldeneye, harlequin duck, and black scoter. All four species of loon are found in the Noatak drainage.

Raptors, whose population have declined significantly in recent decades on the continent, find important habitat within the Noatak drainage. Sixteen species of raptors are known in the preserve. Nesting among rocky cliffs along major drainages are golden eagle, gyrfalcon, and rough-legged hawk.

Golden eagles are common on the lower Noatak, and bald eagles are only rarely encountered in the preserve. Goshawk, sharp-shinned hawk, merlin, and American kestrel inhabit the preserve. Osprey occur in the lower Noatak.

The arctic peregrine falcon is the only threatened species that may occur within the preserve. A number of peregrine nesting sites were identified along the Noatak in past years, but no recent nesting has been documented (Fish and Wildlife Service 1984). Migrants likely pass through the preserve (Fish and Wildlife Service 1984). Although the Eskimo curlew was reportedly found in the region in the past, no sightings have been made in the past 50 years and it is believed to be extinct.

Both the willow ptarmigan (Alaska's state bird) and the rock ptarmigan are commonly found in shrub areas. Both spruce and ruffed grouse are found within the area's woodlands.

In addition to the birds mentioned, a variety of plovers, turnstones, snipes, sandpipers, phalaropes, gulls, terns, owls, larks, swallows, warblers, sparrows, finches, thrushes, and others are encountered. The extensive freshwater habitat within the preserve provides valuable habitat for many of these species. Of special interest among the remaining birdlife are several Asian species that have extended their ranges into North America along the Bering Land Bridge corridor. These include the wheatear, yellow wagtail, white wagtail, bluethroat, and arctic warbler (Center for Northern Studies 1973).

Fish. Approximately 22 species of fish are found within the Noatak drainage. Arctic grayling and arctic char are the most common sport fish. Both spawn on sandy gravel substrate shortly after breakup in the Noatak and its tributaries. Most char are anadromous and are found in the Noatak River and its tributaries upriver as far as the Kugrak River. Chum salmon are found throughout the Noatak drainage; sockeye, coho, king, and pink salmon are also present, but in fewer numbers and confined to the lower reaches of the Noatak River. Chum salmon are the most abundant species and along with arctic char are important subsistence resources.

Inconnu, or sheefish, are a prized sport and subsistence fish known to inhabit the neighboring Kobuk and Selawik rivers as well as the lower Noatak River. Lake trout are found in some larger and deeper lakes (Feniak, Desperation, Kikitutiorak and Narvakrak). Lake trout sportfishing may increase with increased use of the preserve. Burbot, or freshwater cod, also inhabit deep lakes and large streams and prey upon whitefish. Northern pike, whitefish, and least ciscos inhabit rivers and lakes in the region.

The long-nosed sucker is found in rivers, streams, and lakes in the Noatak drainage and is occasionally dried or smoked for eating. The slimy sculpin and the nine-spined stickleback are common prey fish. Blackfish inhabit lowland ponds in the lower Noatak. Fish are an important diet component of the native people within the region and are used fresh, dried, or frozen as a primary source of food.

SEABIRDS & WATERFOWL

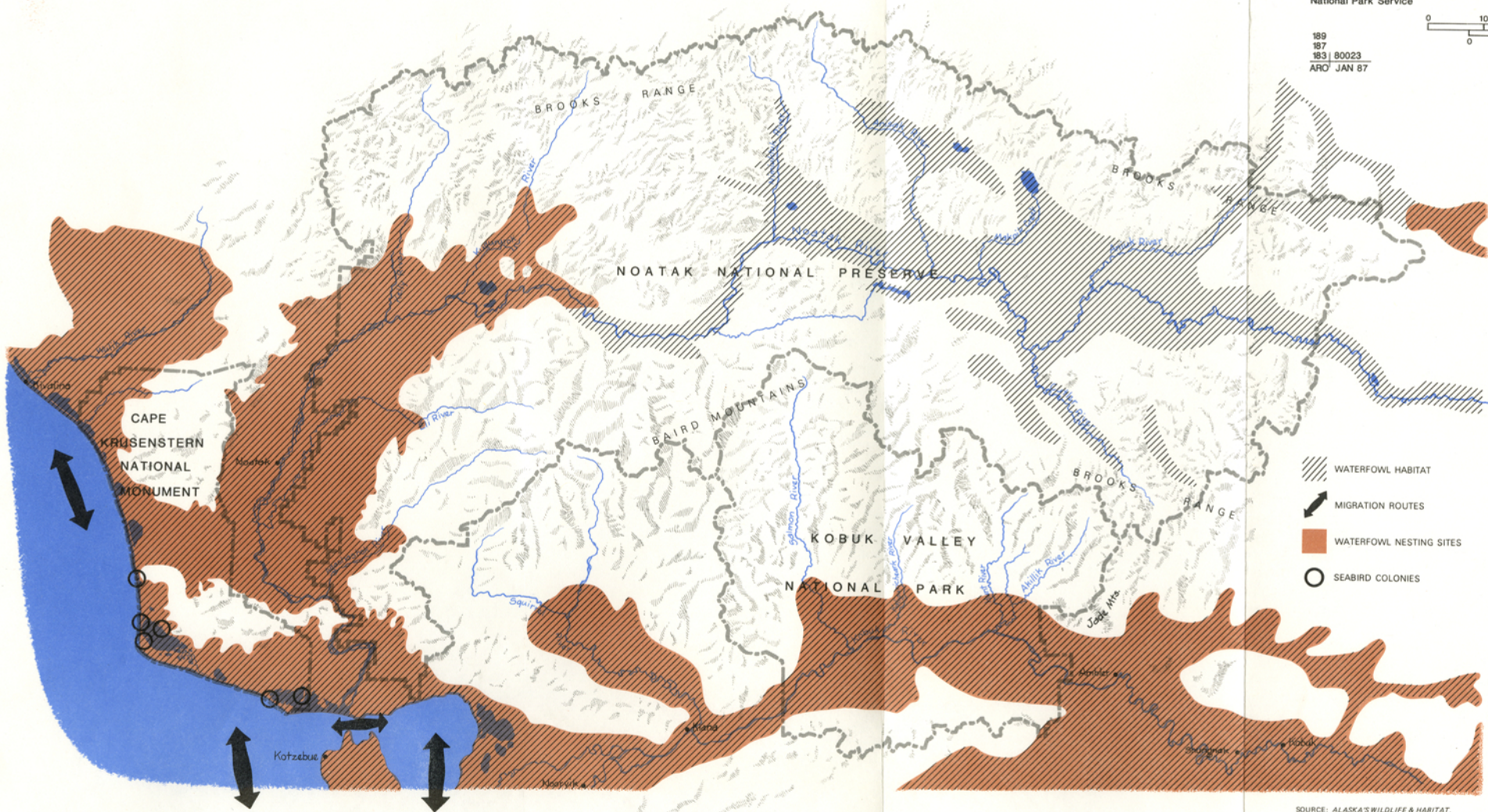
Cape Krusenstern
National Monument

Kobuk Valley National Park

Noatak National Preserve

United States Department of the Interior
National Park Service

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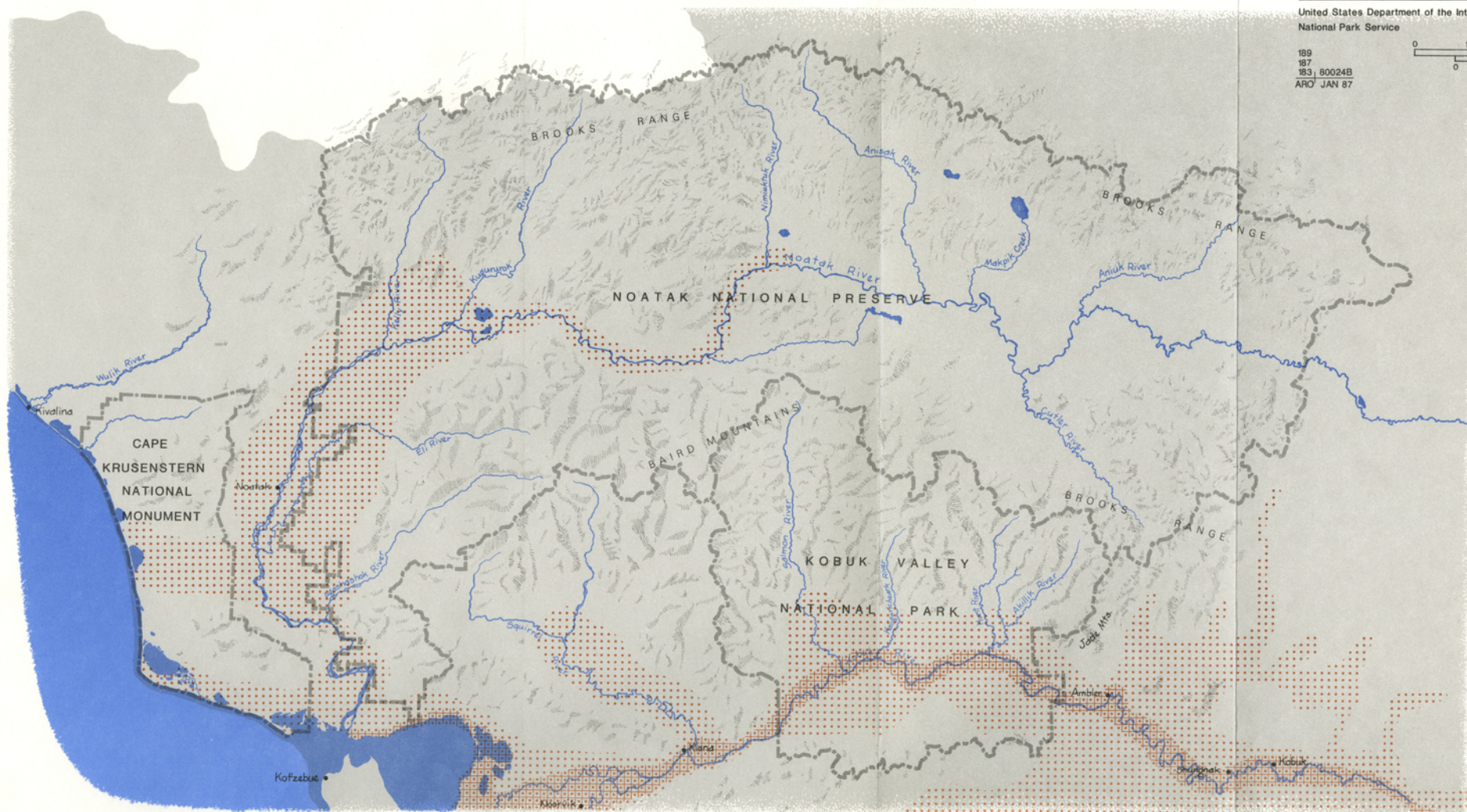
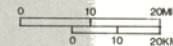


FISHES

Cape Krusenstern
National Monument
Kobuk Valley National Park
Noatak National Preserve

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ARCTIC CHAR/DOLLY VARDEN

NORTHERN PIKE

SHEEPFISH/BURBOT
& NORTHERN PIKE

SOURCE: ALASKA'S FISHERIES ATLAS,
VOLUME I, ADF&G, 1978.

THE RANGE OF FISH ON THIS MAP CONFORMS
TO THE FISH "PRESENT" CATEGORY ON THE
SOURCE LISTED ABOVE. THE "OCCASIONAL"
CATEGORY IS NOT SHOWN ON THIS MAP.

GRAYLING & WHITEFISH PRESENT
THROUGHOUT REGION

SALMON

Noatak National Preserve

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National Park Service

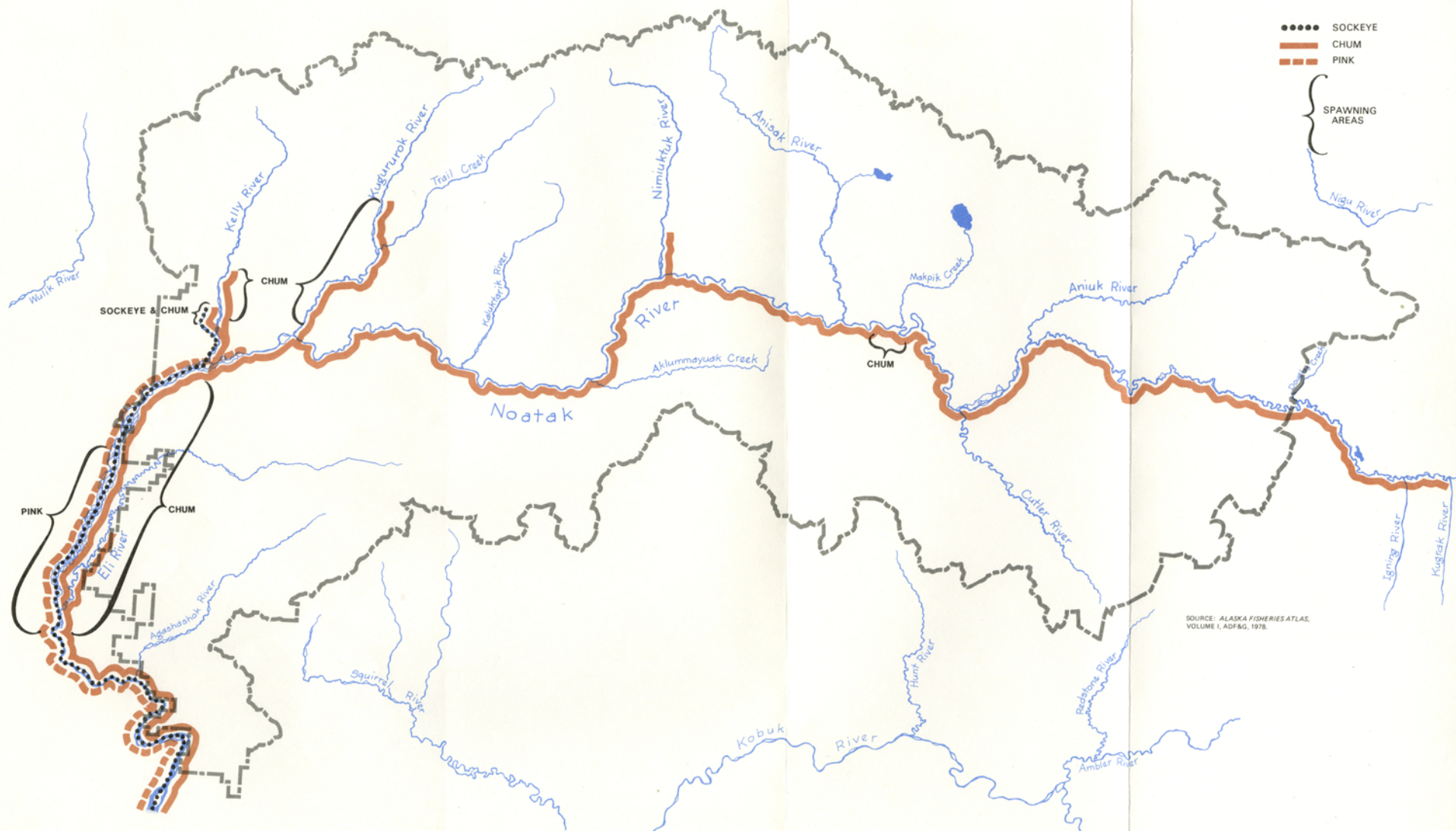
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- SOCKEYE
- CHUM
- PINK

SPAWNING
AREAS



The Noatak River is an important contributor to the commercial and subsistence fisheries' harvest for northwest Alaska. Commercial catches for the Kotzebue area, principally chum salmon, are often worth over one million dollars annually. Subsistence harvest also contributes significantly "if the value of substitute protein food is considered" (ADF&G 1977, p. 125). In addition, the subsistence fishery harvest is at least as important as, if not more important than, the wildlife subsistence harvest because of its dependability and abundance.

Vegetation

The major vegetative types in the Noatak valley are tundra, brush, forest, and aquatic. Much subdivision and overlap of these vegetative types can be discerned. In general, however, the majority of the Noatak National Preserve supports a low mat of tundra vegetation, and boreal forests cover much of the lower Noatak drainage.

At higher elevations (generally 2,500 to 5,000 feet) on windswept, well-drained, rocky slopes of the Baird and DeLong mountains, an alpine tundra community is found. Vegetation is sparse and consists of willow, heather, and avens in combination with grasses, sedges, wildflowers, and mosses. Lichens and saxifrages are common in drier areas. The alpine tundra forms a low vegetative mat no more than a few inches high.

Below the areas of alpine tundra along the foothills of the Noatak River valley, a moist tundra community predominates. This community is the most extensive type within the Noatak National Preserve and in many areas consists almost entirely of pure stands of cottongrass. Shrubs and other species found in moist tundra include willow, dwarf birch, Labrador tea, Lapland rosebay, mountain alder, mountain avens, and saxifrages. Bog rosemary, cranberry, and butterwort are found in wetter areas. In tundra areas where water stands for most of the summer and peaty soil inhibits water percolation, such species as bluejoint, pendant grass, sedges, and rushes are in evidence and mosses become more abundant. Herbaceous plants including salmonberry, louseworts, and marsh fivefinger occupy less boggy locations.

On the beach ridges of some larger lakes, such as Feniak Lake, elements of the alpine and moist tundra intermingle with the brush community. In these few areas a great profusion of vascular plants (more than 200) thrive and produce a spectacular display of vegetation.

A spruce forest community is found on south-facing foothills, valley bottoms, well-drained river terraces, and some lowlands that are generally downstream from the Kugururok River. The upland spruce forest occupies a major portion of the lands flanking the lower reaches of the Kelly, Kugururok, and Eli rivers and appears on the foothills of the Baird Mountains. Nearly pure stands of white spruce are found in association with paper birch, aspen, balsam poplar, and black spruce. Understory shrubs are sparse and include willows and northern red currant. Ground cover consists of sphagnum mosses, reindeer lichens, dwarf shrubs, ferns, and grasses.

On well-drained river terraces east and south of Noatak Canyon, a lowland spruce-hardwood forest is found. White spruce is dominant in association with some black spruce and paper birch. The understory is willow, dwarf birch blueberry, bog cranberry, crowberry, fireweed, and a variety of grasses, sedges, and mosses. The forest is generally open, with mainly mature trees of 50 to 60 feet in height.

Small stands of balsam poplar occur on well-drained, south-facing slopes in isolated areas that are generally downstream from Makpik Creek. In these cottonwood patches, seldom more than a few acres in size, such species as bearberry, soapberry, and shrubby cinquefoil form the understory.

Brush or shrub associations are often found on gravel bars and along riverbanks of the Noatak and its tributaries. This vegetative type is dominant along the floodplain of the Noatak and its tributaries west of the Noatak Canyon. Shrubs are generally between 3 and 10 feet high with no tree development. Willows are dominant, often in association with dwarf birch and alder. Herbaceous species including river beauty, willow herb, fireweed, and an abundance of grasses and sedges are also found.

Aquatic vegetation is found along the shores of shallow ponds and lakes and in the marshes of the Mission Lowlands. Dominant species are pendant grass, marsh horsetail, maretail, northern burreed, buckbean, sedges, and grasses. Submerged vegetation includes pondweed, watermilfoil, and duckweed. Vegetation in the shallow freshwater ponds provides important habitat for insects and animals.

According to a U.S. Forest Service timber resource assessment (1972) only about 35,000 acres within the Noatak and Kobuk river valleys contain harvestable timber. Of this amount, approximately 10,000 acres are sufficiently productive to provide a sustainable yield for firewood and cabin logs.

There are no known endangered or threatened plant species, although Oxytropis kokrinensis, a candidate plant species, is probably present within the preserve (Fish and Wildlife Service 1984).

Fire Ecology

The National Park Service is a participant in the Kobuk Interagency Fire Management Plan (1984), which encompasses 32 million acres of fire-dependent ecosystems extending from the Dalton Highway and the trans-Alaska pipeline on the east to the northwest coast on the west, and from the northern foothills of the Brooks Range on the north to the northern interior on the south. This area includes the three NPS areas in northwest Alaska. The plan, which coordinates the fire management objectives of all the participating regional landowners, was recently completed and put into operation for the 1984 fire season.

During the summer of 1984 and 1985, a fire history and effects research effort was undertaken by the National Park Service. Biological technicians, with helicopter air support, were based at Jade Mountain, a NANA facility near Kobuk Valley National Park. Fire history information was gathered

within the park, and some fire monitoring and research was also done in Noatak National Preserve. This research will continue through 1986 for the preserve. In addition, research has been done for Noatak that was funded through the Man and the Biosphere program of UNESCO (Racine 1982) and the Park Service (Racine 1981, 1985).

CULTURAL RESOURCES

The Noatak River valley probably was first occupied during Paleo-Arctic times, approximately 10,000 years ago (Anderson, 1972). Subsequently the valley has been inhabited by representatives of all the major cultural groups (see Cultural Sequence map). The heaviest uses of the valley were apparently during the Arctic Small-Tool tradition and late prehistoric/historic times. During several periods, particularly between A.D. 400-1200, the valley was unoccupied or at most was sparsely utilized by peoples inhabiting adjacent regions (Hall 1973).

More than 100 prehistoric sites (such as NOA-104, 123; NIM-11; NKR-1 and 2, and others) have been found along the length of the Noatak River, along many of its tributaries, and at such lakes as Feniak, Desperation, and Burial. Surveys have only been conducted along the Noatak River tributary streams and the larger lakes. The cultural history of the area as a whole or the significance of individual sites or resources cannot be judged until more thorough surveys and intensive research at particular sites are completed.

The earliest evidence of movement into the Noatak River valley by late prehistoric/historic Eskimos dates from A.D. 1200-1400. By A.D. 1600 the valley had been effectively recolonized as shown by sites like Kangiguksuk (Hall 1973). Small groups of people, living a nomadic lifestyle based mainly on caribou hunting, spread up the big river and its tributaries. Groups along the lower Noatak still traveled seasonally to the coast (Shesalik and Cape Krusenstern) to harvest maritime resources. The increasing use of dog teams allowed a high degree of mobility and added to the ability to quickly adapt to changing environmental conditions. The archeological record (Hall 1973) indicates that by the late 1600s, Inupiaq peoples were living in relatively large villages along the shores of major lakes (such as Desperation Lake) and perhaps at some locations along the Noatak River. After about 1800, the use of temporary camps instead of villages along the Noatak and its tributaries became more common.

Before 1850 several distinct but related Eskimo groups lived in or used the Noatak River region. Living in the valley were the Naupaktomiut (Lower Noatak) and the Noatagmiut (Middle and Upper Noatak) groups. Groups from the Kotzebue area and the Kobuk River made regular hunting and trading trips into the Noatak region. In addition, the Nunamiut (central Brooks Range) also used the upper Noatak basin. After 1850 the increasing pace of outside contact seriously affected the native lifestyle. Increasing trade, settlement, commercial whaling, fur trade, missionary activity, new diseases, and new hunting patterns proved very disruptive.

In 1908 the California Yearly Meeting Friends Church started a federally supported mission school at the present site of Noatak village. The desire of the Noatak peoples for schooling, Christianity, and western trade goods,

and the concurrent weakening of traditional culture drew them to the site and resulted in the founding of Noatak village (Hall 1973). The lower Noatak people came first because the mission school was in the center of their traditional territory. By 1915 the upper Noatak basin was largely abandoned, except for sporadic use by the Noatak peoples who by then had largely moved into Noatak village.

Exploration of the Noatak River valley by western civilization was preceded by 150 years of trade and contact along the coast of northwest Alaska. Russian trade goods reached people of the Noatak River region through extensive trade ties across the Bering Strait between eastern Siberian native people and those of northwestern Alaska. The first exploration was done by vessels skirting the coast in the 18th century. Beechey surveyed Kotzebue Sound in 1826. Martin, from the HMS Plover, visited the lower Noatak by dogsled in February of 1850. Stoney and Howard, in 1885, made separate winter trips that crossed from the Kobuk region to the upper Noatak. During the summer of 1885 S.B. McLenegan traveled up the Noatak by boat and published a map of the river valley. The Klondike gold rush of 1898 spilled over into northern Alaska, and prospectors explored the Kobuk River and the upper Noatak region (Lucky Six and Midas creeks). More formal geological exploration and mapping were done in 1911 and 1925 (Smith 1913; Smith and Mertie 1930). No physical remains from these explorations have been found in the preserve, although several people published reports based on their trips.

The southwest portion of the preserve is within the Cape Krusenstern Archeological District, which is listed on the National Register of Historic Places. This 2.3-million-acre area was established in 1973 to protect and preserve archeological sites and materials dating back over 10,000 years.

CURRENT AND POTENTIAL PRESERVE USES

There are no valid mining claims in the preserve. Commercial farming, commercial timber harvesting, and grazing activities are not permitted on federal lands within the preserve although there may be some illegal timber harvesting. Because of climatic conditions, agricultural production is limited to small gardening projects, and then only when fertilizer and intensive management are applied (SCS 1980). Agricultural uses would require more detailed study for site-specific information. The forested portions are of value to area residents as sources of cabin logs and firewood. See also the "External Conditions Affecting Land Protection" section in chapter IV for other external existing or potential uses that may affect the preserve.

Access and Circulation

There are no existing roads, railroads or airstrips (other than unimproved gravel bar strips) in the preserve, nor are there any known summer trails. Travel by foot is possible throughout the preserve except for the steeper, snow-covered mountain peaks.

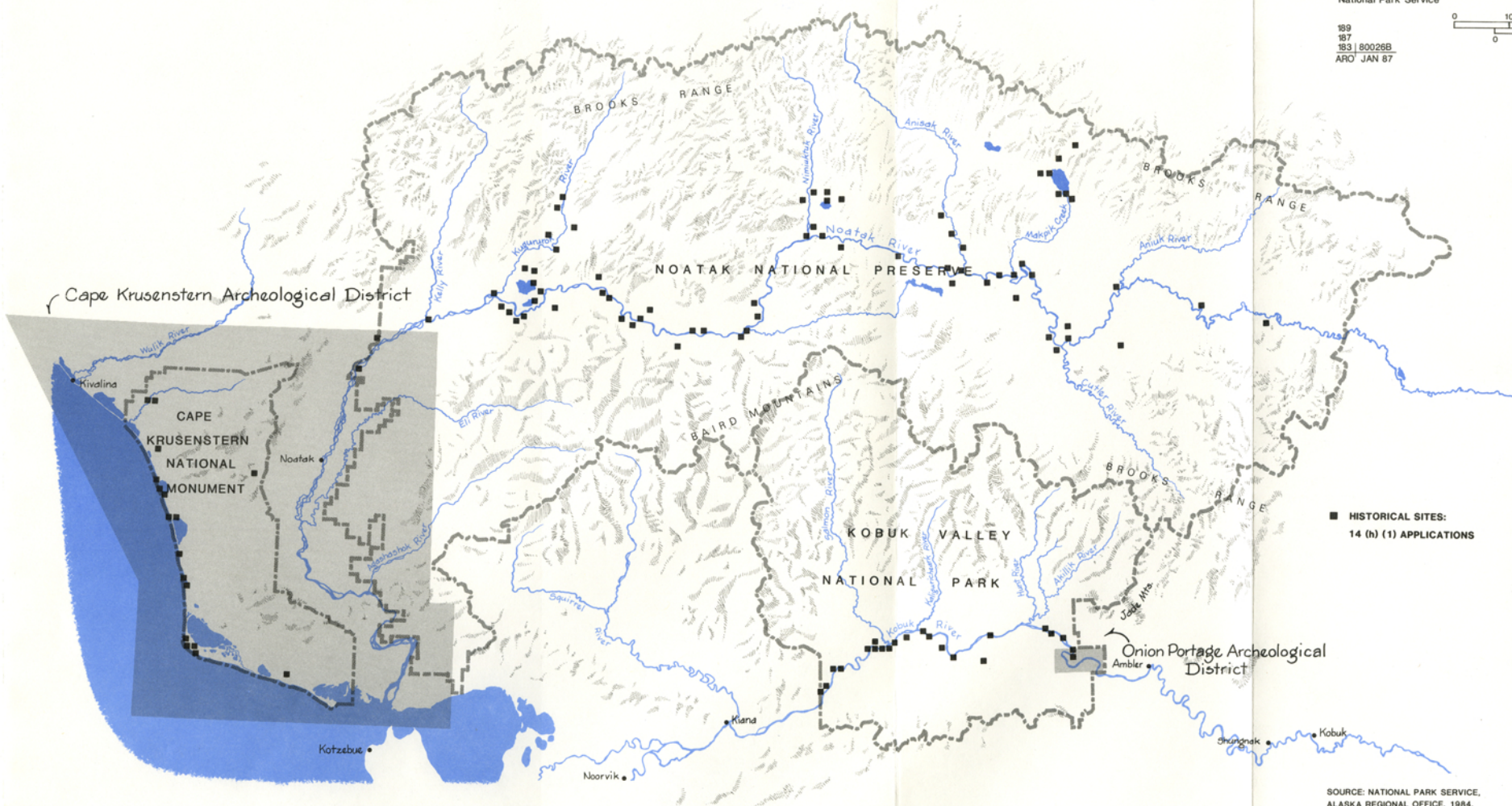
During summer, access for recreation, research, and subsistence activities, as well as for access to private land, is generally by riverboat or airplane. Riverboats can usually reach above Okok Bend and have traveled above Douglas Creek, depending on water levels. Travel down the river and some tributaries

CULTURAL RESOURCES

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■ HISTORICAL SITES:
14 (h) (1) APPLICATIONS

from their headwaters is usually by riverboat, canoe, kayak, or raft. Riverboats also provide access to native allotments along the river and are used for subsistence. Barges with supplies from Kotzebue usually make at least one trip each summer up the river to Noatak village depending on water levels.

Aircraft can land on the numerous gravel bars along the river or on numerous lakes throughout the preserve for recreation, research, subsistence, and access to private land. Helicopters are generally not allowed except by permit from the superintendent.

After freeze-up, most of the Noatak River itself is used as a winter trail (mainly by snowmachine). Certain areas downstream of Noatak village have to be avoided because of open water. The lower Noatak River and its tributaries are used heavily by residents of Noatak and Kotzebue, who may use snowmachines or dogsleds for subsistence, recreation and/or access to private land. Sled dogs are the only known type of pack stock used in the preserve. Some snowmachine travel also takes place in the upper Noatak drainage from Anaktuvuk Pass and the upper Kobuk River villages as residents travel between villages and/or for subsistence. Winter landings with ski-equipped aircraft are common throughout the drainage.

Pursuant to section 17(b) of ANCSA easements have been reserved on Native lands where necessary to provide for continued access to public lands. The following types of 17(b) easements and their locations occur next to the boundary of Noatak National Preserve on NANA and Kikiktugruk Inupiat Corporation lands along the lower Noatak River:

- A. A 25-foot access trail easement to public lands. Allowable uses are travel by foot, dogsled, animals, snowmobiles, two- and three-wheel vehicles, and small ATVs less than 3,000 pounds gross vehicle weight.
 - 1. EIN 3 - part of the winter route connecting with EIN 11 via the Noatak River that forms the Kotzebue-Noatak trail, a winter access corridor through the preserve.
 - 2. EIN 3(a) - year-round trail just downstream of Knapp Creek, which is part of the Kotzebue-Noatak winter trail. See also site EIN 50(a).
 - 3. EIN 5 - summer trail just downstream of the mouth of the Agashashok River. See also site EIN 17.
 - 4. EIN 11 - winter trail going southeast from Noatak village to near the mouth of the Agashashok River which is part of the Kotzebue-Noatak trail.
 - 5. EIN 39 - trail up Hugo Creek. See also site EIN 58.
- B. A one-acre site easement, which serves as a resting/camping area and/or trailhead to trail easements. Allowable uses are vehicle parking (e.g., aircraft, boats, ATVs, snowmobiles, cars, trucks), temporary camping, and loading or unloading. Temporary camping, loading, or unloading shall be limited to 24 hours.

1. EIN 17 - an upland resting and camping area and trailhead for EIN 5.
2. EIN 50(a) - trailhead for EIN 3(a). No camping will be permitted.
3. EIN 58 - trailhead for EIN 39. No camping will be permitted.

The easements are shown on the Land Status map in chapter IV. More detailed maps and descriptions of 17(b) easements (as well as other land status information) are available at NPS offices in Kotzebue and Anchorage. Additional 17(b) easements may be identified in the preserve and/or surrounding area, and some may be assigned for NPS administration as lands are conveyed to native corporations in the future. The management of 17(b) easements is discussed in the "Access and Circulation" section in chapter III of this document.

The state of Alaska has also annually funded the marking of a winter route between Kotzebue and Noatak. A portion of this route crosses the southwest edge of the preserve at two locations as extensions of the 17(b) easements EINs 3, 3(a) and 11 listed above. This route could be a right-of-way under Revised Statute 2477, although at the present time (October 1985) the state contends that the winter trail on the Noatak River west of the preserve is a potential RS 2477 candidate. No determination of legal status for either trail has been made.

The Western and Arctic Alaska Transportation Study (Alaska Department of Transportation and Public Facilities 1981) identified three parallel corridors that could potentially cross and/or affect Noatak National Preserve (see External Influences map in chapter IV). The three are a road, railroad, and/or slurry pipeline that would connect the Ambler Mining District with the coast near Cape Krusenstern. There are, however, no current or proposed plans to further study any of the three corridors. The state of Alaska contends, however, that because of the mineral values in the Ambler mining district, further studies are likely.

Also see the summary charts for general access provisions in appendix I and chapter III, "Access and Circulation," for additional information on access.

Recreational Uses

Recreational use is estimated to be about 2,000 to 2,500 people per year. Sportfishing, river floating, and hunting account for a majority of the recreational use in the preserve. A relatively small amount of backpacking and photography also takes place.

There are 25 commercial operators providing air charter and guiding services in the preserve. Seven of these are based in Kotzebue at least part of the year.

The gravel bar at the Kelly River confluence is estimated to receive 40-50 percent of all visitor use in the preserve. During the summer of 1984, 325 people were personally contacted there by NPS employees. It serves as a drop-off or pick-up point for fishing, hunting, floating, and other recreational or subsistence activities and many weekend fly-in visitors from

Kotzebue also use it. In the upper river, the area near the mouth of the Cutler River receives a smaller but still high amount of use because of its location; it is used as a take-out point for those floating the upper Noatak from Gates of the Arctic National Park as well as for hunting, fishing, and as a put-in point to float down the Noatak River.

The trend is for all recreational activities to increase because of publicity about the area, a growing Alaska tourism industry, and because some commercial operators will become more active to promote and expand their services.

The State Division of Tourism indicates that tourism statewide has increased from 5 to 7 percent annually over the past five years (Division of Tourism, personal communication 1984). It is expected that recreational use of the preserve will probably meet and/or possibly exceed these increases at least during the first 10 years of the preserve's existence. As people satisfy their interests and visit the preserve, it is expected that recreational use will level off at or near the increases in statewide tourism. Consequently, it is estimated that recreational use in the preserve will increase somewhere between 5 and 10 percent a year during the life of this plan.

Scientific Studies

Numerous natural and cultural resource studies have occurred before and since the establishment of the preserve. These studies are beginning to provide important baseline and background information against which future environmental changes within or outside the preserve may be compared. The studies are summarized in the following paragraphs. Additional information about these studies may be obtained from the NPS Kotzebue office.

Raptor surveys occurred in the mid-1960s, in 1976, 1982, and 1986.

In 1973 a survey of the Noatak River valley was done. This survey covered vegetation, soils, water, mammals, birds, insects, and archeology (Center for Northern Studies 1973).

In 1979 a study of subsistence use in the Noatak River valley was completed (Uhl and Uhl 1979).

Since 1981 the effects of and the history of tundra fires have been and continue to be examined by the National Park Service and others (Racine 1981, 1982, and 1985).

Large-mammal surveys and studies, notably caribou and Dall sheep, continue in cooperation with the ADF&G and the Institute of Wildlands and Wildlife. Some of the surveys predate the establishment of the preserve (such as ADF&G 1981, 1983a, 1983b, 1984b, 1985b, and NPS 1983).

The ADF&G is on its second year of a genetic study of chum salmon and the life history of arctic char in the Noatak basin (ADF&G 1985).

There has been and will continue to be various surficial mineral and geological studies in the preserve by the Bureau of Mines, U.S. Geological Survey, ARCO, EXXON and Cominco.

In 1981 a national natural landmark study for ecological features was completed for the Brooks Range. The National Natural Landmarks program was established by the secretary of the interior in 1962 as a natural areas survey to identify and encourage the preservation of geologic features and biotic communities that best illustrate the natural heritage of the United States. Although no sites have yet been designated national natural landmarks within the preserve, the following 11 sites have been identified as potential national natural landmarks: Anuk Lake and Upper Cutler River, Feniak Lake, Howard Pass, Kelly River confluence, Kipmik Lake, Noatak Grand Canyon, Trail Creek, Mission Lowland (lower Noatak River), Utukok River Headwaters, Eli River Headwaters, and Upper Squirrel River (Bliss and Gustafson 1981).

In 1984 a University of Washington researcher examined lake bottom samples within the preserve to help determine the vegetative history of northwest Alaska.

Subsistence Uses

The Noatak River and its web of tributaries and feeder lakes is host to a variety of fish, wildlife, birds, and vegetation that are used for a variety of subsistence purposes. The archeological record indicates that people have been attracted by these resources for well over 10,000 years. These same resources, and others, continue to attract human use and provide support for local social and cultural continuity.

Current Situation. In response to economic, social, and technological changes, there have been changes in subsistence strategies. Muscle power has been replaced or supplemented by machine power. The modern snowmachine has become the primary mode of winter surface travel. Boats constructed of wood, metal, or fiberglass and powered by large outboard motors have virtually made the paddle-driven skin boat and plank-poling boat things of the past. These and other technological advancements, such as CB radios, chain saws, powered ice augers, and other equipment, have substantially modernized subsistence activity.

An individual or a relatively small number of persons can now usually accomplish hunts and other activities that once required the effort of a large cooperative group. The demands posed by wage employment, schools, modern homes, and other factors tend to constrain the time that can be allotted to subsistence, and harvest activities often occur in short periods of intense activity rather than long-term sustained subsistence practices. There is also the tendency for smaller groups to carry out subsistence harvests for their families, while others pursue wage-earning employment or offer other types of support services.

Subsistence continues to provide substantial economic support for local residents. Protein from fish and game is, in varying degrees, a major contributor to the local diet. Without this source of food many families

would find it difficult, if not impossible, to purchase the supplies necessary to live in the region. Within the preserve trapping fur-bearing animals is, at times, an important contributor to the general cash economy of rural residents. Berries, roots, and other edible vegetation help to complete the diet. Wood in the preserve provides fuel for heating camps.

Subsistence serves not only as an economic support but also as a cultural and social focus of the local residents. Land and resource use is directly tied to cultural history, spiritual beliefs, sharing patterns, status, territoriality, value systems, etc. The participation in, even if peripheral, and identification with subsistence pursuits are unifying forces in the local culture; without them many cultural customs and traditions would lose their relevance and eventually disappear, which would eventually diminish the viability of the culture as a whole.

Subsistence Resource Use and Seasonality. Noatak National Preserve is part of a much broader local subsistence use area. The combined local subsistence population uses an immense subsistence territory that stretches far beyond the boundaries of the preserve. Although a few activities are relatively specific to the preserve, most subsistence pursuits flow across the landscape without regard to political boundaries. Depending upon such variables as weather, wildlife movements, travel conditions, and changing socioeconomic conditions, an activity that is intense one year may be light or even absent the following.

Subsistence activities within the Noatak National Preserve are strongly influenced by the presence of the Noatak River and its tributaries. Fish and waterfowl are found in or on the water itself; moose, ptarmigan, hare, lynx, and other wildlife species are drawn to the edibles found near the edge of streams. During summer the major waterways provide a highway for human travel because crossing the swampy, tussock-covered tundra is extremely slow and laborious. During the summer it is estimated that 90 percent of the subsistence activities in the preserve take place within 2 miles of either side of the main Noatak River and the navigable stretches of the larger tributaries.

During the long winters, most travel occurs along the rivers and streams. The open tundra is often so windswept that exposed tussocks and rocks make snowmachine travel uncomfortable and cause increased wear on the machines. In the upper portions of the tributaries there is usually more snow and subsistence travel is more widespread. However, the great majority of subsistence activities within the preserve continues to occur within a relatively narrow band bordering such streams.

The following is a representative cycle of seasonal subsistence activities in the preserve.

Table 2. Seasonal Subsistence Activities

Spring (late March - mid-May)	Summer (mid-May - August)
1. Caribou hunting, particularly in April, for spring and summer meat.	1. Fishing for salmon and char
2. Waterfowl hunting	2. Gathering edible plants
3. Bear hunting	3. Early caribou hunting (mid through late August)
4. Early gill-net fishing	4. Early moose hunting
	5. Waterfowl hunting
	6. Dall sheep hunting
Fall (September - October)	Winter (November - March)
1. Caribou hunting	1. Trapping
2. Moose hunting	2. Caribou hunting
3. Gill-netting	3. Ptarmigan hunting
4. Seining	4. Dall sheep hunting
5. Bear hunting	5. Gathering firewood
6. Waterfowl hunting	6. Moose hunting
7. Gathering edible plants	7. Netting under the ice
8. Gathering firewood	8. Hook and line fishing through the ice

The trend appears to be that subsistence uses will continue at least at present levels and possibly at increased levels. Within the region employment opportunities for local residents are limited; consequently, subsistence activities for many residents are important means of livelihood. A number of factors could contribute to increased pressures on subsistence resources. They include increasing uses of modern equipment, growth of local populations (3 percent per year regionwide), more educational opportunities, which would keep students at home more, and resurgent interests in preserving native cultural activities. Industrial developments and increased uses of resources outside the preserve could also lead to increased subsistence activities within the preserve. Larger harvests and reductions of harvestable resources are, then, possibilities, touching upon varying authorities and responsibilities of the Alaska Department of Fish and Game, state fish and game boards, and the National Park Service to maintain habitats for and healthy populations of fish and wildlife. Additional subsistence data can be obtained by reviewing publications from the NANA Coastal Resource Service Area Board; Maniilaq Association; Subsistence Division, ADF&G; the Joint Federal-State Land Use Planning Commission; Nuatakmitt: A Study of Subsistence Use of Renewable Resources in the Noatak River Valley by William and Carrie Uhl; and appendix F.

PRESERVE OPERATIONS

The preserve, along with Cape Krusenstern National Monument and Kobuk Valley National Park, is administered from the Kotzebue headquarters office. The staff, consisting of the superintendent, management assistant, chief ranger, resource management specialist, headquarters ranger, administrative technician, and receptionist, are in the NANA museum building along with a

small visitor contact station, with the latter open only during the summer months. The contact station can presently accommodate up to 15 people. These facilities occupy about 1,700 square feet. Four to six additional seasonal personnel assist the permanent staff with preserve management. Usually half of the seasonal personnel are local or regional residents. The National Park Service also has a 4,500-square-foot building for storage and shop space next to the NANA building. Some seasonal employee housing is provided in an 800-square-foot log cabin behind the storage building. A tie-down space for NPS aircraft is presently rented at the Kotzebue airport. Government housing is not provided, and employees rent or purchase housing within Kotzebue.

Within the preserve are two seasonal ranger stations that are used during the summer months. One is near the Kelly-Noatak rivers' confluence and consists of two tent frames. The other is near the Makpik-Noatak rivers' confluence and consists of two tent frames. Both stations are operated during the summer, although the Makpik station will be staffed only intermittently depending on personnel available and funding. (The Makpik station replaces a similar station formerly near the Cutler River.) Aircraft, foot, and boat patrols are conducted during the summer from these and other locations within the preserve.

During the winter, patrols are conducted by snowmachine and aircraft from Kotzebue.

